

OBJECTIVE OF INTEGRATED SAFETY MANAGEMENT: The department and contractors must systematically integrate safety into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment. This is to be accomplished through effective integration of safety management into all facets of work planning and execution. In other words, the overall management of safety functions and activities becomes an integral part of mission accomplishment.

As discussed in Section 2, there are positive aspects and deficiencies in each of the seven evaluated elements (which correspond to the guiding principles of safety management). When viewed individually, four of the evaluated elements (Clear Roles, Responsibilities, and Accountability; Balanced Priorities; Competence Commensurate with Responsibility; and Identification of Standards and Requirements) had effective performance with respect to the established criteria (GREEN). Two of the elements (Hazard Analysis, Work Planning, Hazard Controls, and Operations Authorization; and Performance Evaluation and Feedback) need improvement and significant management attention (YELLOW). For one element (Policy, Leadership, and Worker Empowerment), the ratings were split (GREEN/YELLOW) to reflect the many positive elements and the OAK and LLNL senior management commitment to improvements, while also indicating that a number of deficiencies remain to be addressed and the initiatives have not yet had the desired effect.

The seven evaluated elements, however, are interrelated and need to be considered collectively with respect to their impact on the ISM program. This section discusses how the results of the individual elements “roll up” into the two upper-tier categories—management responsibilities and management implementation—and then into the overall assessment of line management’s effectiveness in establishing an ISM system.

Management Responsibilities

The “Management Responsibilities” category includes the first four evaluated elements (including Competence Commensurate with Responsibility, which is also directly relevant to implementation). These elements are grouped together because they encompass the responsibilities of DOE and contractor senior manager in establishing an environment that is conducive to an effective safety management program, such as establishing policies and ensuring that resources are sufficient to achieve an effective ES&H program. Although individual weaknesses were identified in all four of the evaluated areas, three of the four relevant evaluated elements, and portions of the other element, were judged to be effective with respect to the established criteria.

In many respects, OAK, UC, and LLNL have been proactive in establishing elements of a safety management program. Some of the key elements of safety management have been in place for years at LLNL; for example, LLNL has a longstanding program to incorporate ES&H support personnel into the line organization. OAK, UC, and LLNL have also had performance-based contracts and performance metrics in place for several years and have been among the leaders in the use of systematic tools to prioritize resources and make decisions about facility utilization.

DOE (OAK, DP, and EM) and LLNL management and staff exhibited sufficient technical competence, experience, skill mix, and knowledge of hazards to effectively and safely manage the various research and national security programs. The results of this Safety Management Evaluation indicate that DP, EM, OAK, UC, and LLNL management are supportive of LLNL ES&H infrastructure requirements, including maintenance and upgrade of facilities and equipment and ES&H needs (fire protection and emergency

management equipment). The DOE and LLNL processes for establishing and balancing priorities between mission-related and ES&H activities and resources are effective. LLNL has implemented a process for the effective prioritization for the upkeep, deactivation, and reuse of excess facilities and equipment. Both OAK and LLNL make effective use of available DOE prioritization tools such as the Capital Assessments Management Process to establish and balance site priorities.

The OAK Manager and Laboratory Director have recognized and communicated the need for improved safety culture at LLNL and have initiated a number of initiatives to enhance safety performance. ISM has been embraced by senior management as one of the primary mechanisms for accomplishing the needed improvement and change. While ISM is being promoted as a policy at the highest level of the three organizations, it has not yet been effectively incorporated into LLNL policy implementation documents and mechanisms, embraced, understood, and promoted at every level of the LLNL organization, nor has it been effectively integrated into all mission activities, work planning, and hazard controls in a manner that would accomplish and drive improvements and change. Further, LLNL management has not yet provided the strong leadership needed to ensure that lower-tier managers, supervisors, and workers accept the need for change, understand safety management principles, and are provided specific expectations and direction for achieving the needed improvements.

Although weaknesses remain to be addressed in the management responsibilities category, OAK and LLNL management have generally been effective in defining roles and responsibilities and processes for allocating resources, and they generally have competent and qualified personnel. The framework for improvement is in place and the commitment to improve is evident. Correspondingly, the management responsibilities category is judged to have effective performance (GREEN).

Management Implementation

The “Management Implementation” category focuses on the last three evaluated elements and considers Competence Commensurate with Responsibility, which is inherent in the implementation of safety management. The elements in this category

encompass the implementation of ES&H policies in the performance of the site mission and assess the effectiveness of implementation in the field. As discussed in Section 2, two of the three areas were judged to need improvement and significant management attention.

Effectively implementing a safety management program requires that the components of the site program, such as requirements management, hazards analysis, work planning and control, operations authorizations, performance assessments, and corrective action programs, be effective both individually and collectively. OAK and LLNL have been generally effective in the identification of requirements at the institutional level; however, LLNL has not been effective in tailoring requirements at the work activity level. LLNL has developed the required implementation plans for upgrading Safety Analysis Reports and Technical Safety Requirements in accordance with DOE orders and recently completed upgrading of the Safety Analysis Report for the Plutonium Facility.

The hazards associated with large projects and programs are well-defined and controlled. However, mechanisms are not in place to consistently ensure that work activities are appropriately evaluated, authorized, and controlled. In addition, the hazard analyses that support the LLNL Emergency Management Program, including methodology, scope, and documentation warrant improvement and management attention.

Established performance evaluation processes are being implemented and are resulting in the identification and correction of deficiencies. However, assessment activities have focused on material conditions and have not adequately focused on work performance and processes. In addition, corrective actions too often address only symptoms and not the causes of deficiencies and thus are not effective in preventing recurrences.

Although some aspects of safety management implementation are functioning, there are weaknesses in hazards analysis, work planning, hazards control, and performance assessments, and these components are not effectively integrated into a system that ensures that work is performed in accordance with requirements. Correspondingly, the management implementation category is judged to need improvement and management attention (YELLOW).

Integrated Safety Management at LLNL

Although many enhancements are under way, the safety management program at LLNL is only partially achieving DOE's objective of integrating work planning, hazard analysis, and hazard control into all levels of management so that work is performed safely. Some operations and activities are demonstrating effective ES&H performance. However, as demonstrated by a number of LLNL events, including the filter-shredder event and the criticality safety infraction in the plutonium facility, hazards at the work activity level are not managed and controlled effectively for some activities. Correspondingly, the overall integrated safety management program is deemed to be split between effective performance and needing improvement and significant management attention (GREEN/YELLOW)

This is the first time in the conduct of EH Office of Oversight Safety Management Evaluations that the overall rating has been split. The decision to divide the rating was based on the desire to recognize the effective elements of safety management in place at LLNL while, at the same time, acknowledge the improvements needed to upgrade ES&H safety performance and achieve the desired change in safety culture.

The Green portion of the overall rating recognizes OAK, UC, and LLNL efforts to establish a number of the essential elements of effective safety management. These include a performance-based contract, an appropriate balance between ES&H and mission priorities, clear roles and responsibilities, and effective identification and transmittal of requirements. OAK, UC, and LLNL are effectively

teaming, under a "Partnership for Performance," to monitor and continuously improve ES&H performance. More recently, OAK, UC, and LLNL senior management have committed to integrating safety into all their activities, including incorporating the commitment to ISM into the UC contract. The OAK Manager and LLNL Director have acknowledged, based on recent events and worker injury/lost workday rates, a need to further improve safety performance and to change the LLNL safety culture. A number of recent OAK and LLNL improvement initiatives have resulted from this recognition.

The Yellow portion of the overall rating recognizes that the new improvements, initiatives, and the commitment to ISM have not yet achieved fully effective safety management or the desired level of ES&H performance. These policies and commitments have not yet filtered down into LLNL policies, implement documents, and work control mechanisms. As demonstrated by recent events, relatively constant worker injury rates, and senior management's acknowledgment of a need for improved ES&H performance, the existing LLNL work control mechanisms and processes are not assuring the effective application of safety management principles to all work activities and associated hazards. LLNL workers do not yet have a clear understanding of what is expected of them under an ISM system, a deficiency that can only be solved through strengthened leadership, training, worker involvement, and accountability.

A combination of the existing effective elements of LLNL safety management and maturing of current improvement initiatives could, in time, achieve the desired change in LLNL safety culture and effective overall performance rating in safety management.

The ratings are summarized in Figure 7.

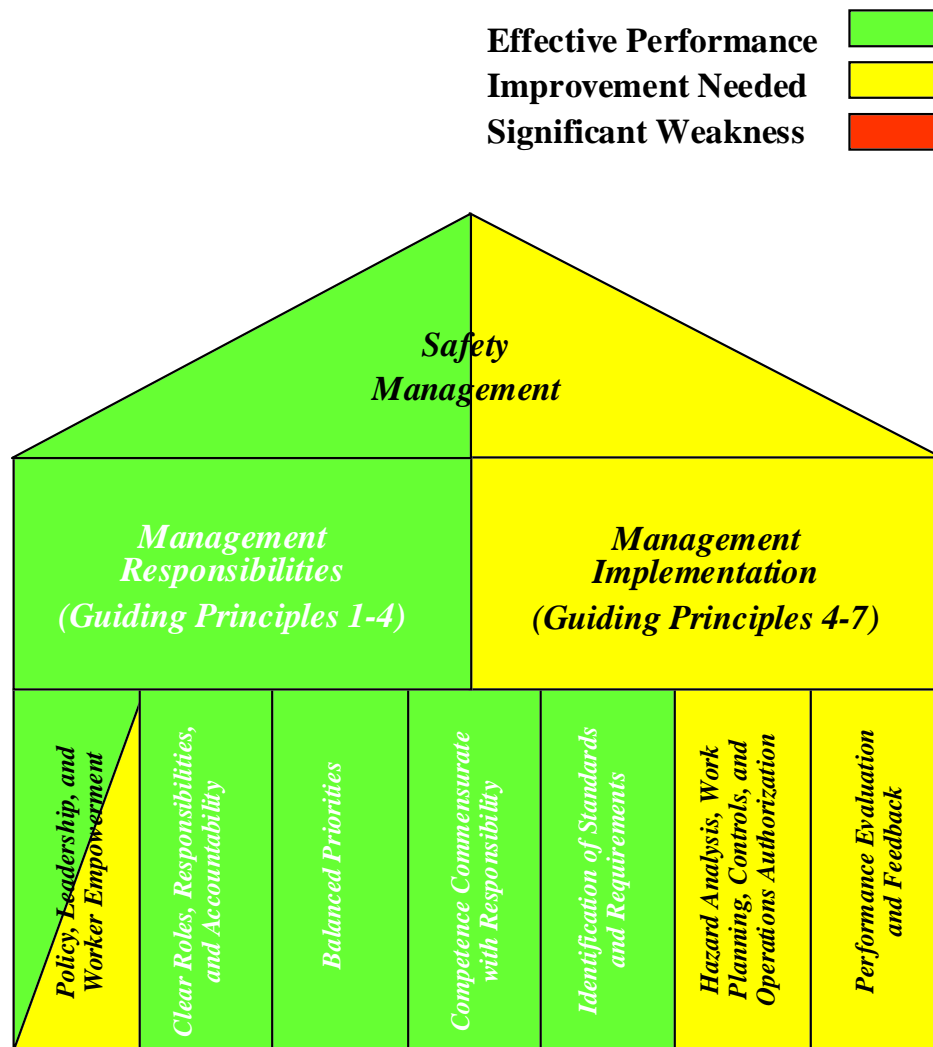


Figure 7. Ratings

The safety management evaluation conducted by the Office of Oversight identified several opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible DOE and contractor line managers and prioritized and modified as appropriate, in accordance with site-specific programmatic and ES&H objectives.

Oakland Operations Office

- Strengthen OAK assessments of contractor ES&H performance, including formal and timely feedback on deficiencies, evaluation of causes, and actions to verify the effectiveness of corrective actions.
 - Strengthen the contribution of subject matter experts to LLNL ES&H performance by ensuring they conduct assessment activities outside of the annual OAK appraisal and communicate significant issues in writing to LLNL management.
 - Increase Facility Representative's and subject matter experts' surveillance focus on human performance (versus material condition and housekeeping) and on the effective implementation of ISM and the five core functions at LLNL.
 - Increase the presence of Facility Representatives, subject matter experts, LSO managers, and LSO staff and surveillances at low-hazard facilities, where the hazards to workers may be greater.
- Consider OAK-LLNL joint for-cause assessments to identify the management programmatic weaknesses contributing to chronic performance deficiencies, adverse performance trends, significant safety issues, or events, accidents, and near misses.
- Clarify nonspecific UC contract performance metrics and ensure that stated performance objectives are sufficiently challenging to achieve continuous improvement in LLNL ES&H performance.
- Develop a process for formally transmitting the issues and deficiencies identified during operational awareness activities to LLNL and for evaluating LLNL's corrective actions.
- Improve the OAK Employee Concerns Program for the LLNL site, including a hotline number, timely response and resolution, and communication of the existence of the program to LLNL employees.
- Improve the process for transitioning to Work Smart standards, to include an evaluation of the need to transmit applicable new or revised DOE or external requirements to LLNL during the transition to Work Smart standards and the establishment of schedules and mechanisms for linking Work Smart standards to existing LLNL processes such as facility safety procedures and operational safety procedures.
- Continue to implement new OAK improvement initiatives such as the Self-Assessment Program and the Oakland Information Management System.

LLNL

- Improve the understanding, acceptance, and sustained implementation of ISM and enhance the safety culture through leadership, accountability, and worker involvement:
 - Acknowledge a need for change and endorsement of ISM at all levels of management and supervision within LLNL.
 - Strengthen management and supervisory leadership for ISM, and improve ES&H performance through increased field presence, human performance observations, coaching and training, and providing direct performance feedback.
 - Strengthen individual accountability for performance and the implementation of ISM at the management, supervisory, and staff levels through positive rewards, as well as discipline and retraining where warranted.
 - Strengthen employee ownership and commitment to ES&H and ISM by increasing efforts to involve workers, researchers, and supervisors in the development of safety initiatives.
 - Revise LLNL policy and implementing documents to reflect ISM and the five core functions.
 - Develop and implement a work planning and control process or mechanism that encompasses all site activities and effectively applies the five core functions of ISM, as appropriate to the level of hazard involved:
 - Ensure effective definition of the work and work scope through a work control mechanism, planning, and walkdown of the work site as appropriate.
 - Use appropriately trained and experienced work planners, supervisors, ES&H teams, or safety professionals to conduct and integrate hazards screening and evaluation.
- Consider applicability of computer-based hazard screening systems to identify potential hazards and controls.
 - Identify hazard controls commensurate with the level of hazard, including necessary permits, surveys, personnel protective equipment, etc.
 - Ensure effective pre-job briefings that involve workers, supervisors, and ES&H Teams or safety professionals.
 - Tailor requirements so that they are captured in work documents.
 - Provide adequate and appropriate instructions in the form of work packages, procedures, drawings, or written work instructions to ensure that the work can be accomplished properly and safely.
 - Provide increased direct supervision of work and adherence to the ISM core functions, the defined work scope, and work instructions, procedures, and permits.
 - Provide an effective feedback tool from managers and staff to achieve continuous improvement in work planning and control process and the implementation of ISM.
- Develop and implement LLNL policy on procedure use and adherence:
 - Increase efforts to validate procedures to assure quality and acceptance, including involvement by procedure users.
 - Define which procedures must be followed verbatim, must be in hand during implementation, must contain sign-off for steps, and which are for reference and training only.
 - Make procedures readily accessible to users and increase supervisory presence to ensure use and adherence.

- Hold managers, supervisors, staff, and subcontractors individually accountable for the proper use and adherence to approval procedures.
- Strengthen the contribution of LLNL performance monitoring and assessment activities to the implementation of ISM, improved ES&H performance, and changing the safety culture:
 - Strengthen independent and self-assessment activities through improved research, preparation, planning and structure, increased focus on human performance and implementation of ISM, and improved documentation, trending, and corrective actions.
 - Strengthen management walk-throughs of facilities through increased planning and structure, documentation and trending of issues, increased focus on human performance, and the implementation of ISM.
 - Improve analysis of events, accidents, and near misses to identify and correct systematic management system or programmatic weaknesses, and facilitate more effective trending of similar deficiencies and identification of generic ES&H performance weaknesses.
 - Incorporate the five core functions of ISM into the analysis of events, accidents, and adverse performance trends.
 - Increase the involvement of workers in self-assessment activities to increase understanding of management policies and ES&H performance expectations, work-level insights, and ownership and buy-in to corrective actions and improvements.
- Continue to improve subcontractor safety management and performance:
 - Apply safety record pre-screening and effective contract ES&H requirements and performance metrics in small subcontract projects including support services.
 - Increase field monitoring and subcontractor work practices and adherence to DOE and LLNL safety policies and subcontract ES&H requirements, particularly for small support services contracts.
 - Ensure adequate and appropriate institutional training for subcontractors in areas such as safety policies, LLNL lockout/tagout program, radiation, chemical, and industrial hazards, and emergency response.
- Strengthen the LLNL emergency management and response capability:
 - Implement a mechanism for performance of hazard surveys and hazard assessments that defines and documents on a continuing basis hazardous material risks and processes, and establishes the basis upon which the Emergency Management System is structured.
 - Delegate emergency classification and notification authority in the early stages of emergency response to Incident Commanders until relieved of the responsibility by the Laboratory Emergency Duty Officer and the Emergency Response Organization staff. This authority would enhance the Laboratory's ability to make timely emergency classifications and notifications.
 - Provide incident commanders and hazards control technicians who respond to off-normal events with the additional tools (current data base of significant hazardous materials) and training to perform quantitative (rather than qualitative) consequence assessment of off-normal events to the extent possible to permit accurate decision-making (classification and protective actions for

workers and the public) during the critical, early stages of event response. The equipment and personnel are available but not effectively utilized.

- Implement a mechanism for Operational Emergencies that permits prompt notification

of all off-site jurisdictions and others in the notification chain without interference of primary duties. Implement in the near-term the DOE Order 151.1 requirement concerning prompt notification of operational emergencies that do not require further classification.

APPENDIX A

EVALUATION PROCESS AND TEAM COMPOSITION

The evaluation was conducted according to formal protocols and procedures, including an Appraisal Process Guide, which provides the general procedures used by the oversight program for conducting inspections and reviews, and the Safety Management Evaluation Plan, which outlines the scope and conduct of the evaluation process. Training sessions were conducted to ensure that all team members were informed of the evaluation objectives, procedures, and methods. The planning process considered previously identified weaknesses, current LLNL activities, and DOE and LLNL management initiatives. The evaluation team collected data through interviews, document reviews, walkdowns, observation of activities, and performance testing. Interviews were conducted with Headquarters, OAK, contractor managers, technical staff, hourly workers, and union representatives.

Scope

The ISM evaluation is a “top to bottom” review of ES&H management; it encompasses the organizations responsible for LLNL from the program office to the DOE operations office, to the managing and operating contractor, to subcontractors, and ultimately to the workers at selected facilities. The evaluation also samples the effectiveness of ES&H programs from the identification of applicable policies to their implementation by the worker on the “shop floor.”

The basis for this evaluation is a conceptual framework or template that characterizes the principles, programs, and disciplines that are essential elements of a sound safety management program. This conceptual framework centers around the objectives, principles, and functions for ISM systems described in DOE Policy 450.4, *Safety Management System*.

This approach is based on the fundamental premise that line managers are responsible and accountable for managing ES&H through proper work planning, hazard analyses, hazard control, and ongoing self-assessments of the efficacy of implemented controls. This template can

accommodate the wide range of operations, hazards, and management styles at DOE facilities.

The components of the ISM program, as defined in the January 1996 DOE policy, are essential elements of any ES&H program, and each DOE site should currently have most of the elements in place. The Office of Oversight recognizes that LLNL, as well as other DOE facilities, are in the very early stages of formally integrating the components into a system, such as envisioned in the new policy, and that full integration will take some time. Key elements of ISM, including the guiding principles and core functions, were examined to evaluate which elements are functioning effectively and to identify which areas need improvement and management attention.

A selected sample of LLNL facilities was evaluated to understand how the guiding principles and core functions of safety management are actually implemented: Building 332 (plutonium facility), 321 Complex (machining facilities), Building 222 (Chemistry and Materials Science Laboratory), Building 612/514 (Waste Management Complex), Site 300 (preparation and testing of high explosives), and the National Ignition Facility Construction Project. The safety management evaluation examined selected ES&H programs, including conduct of operations, criticality safety, fire protection, process safety, occupational radiological protection, industrial hygiene, emergency management, construction safety, engineering modifications, waste management, groundwater protection, explosive safety, maintenance, electrical safety, and environmental radiological protection. These facilities and ES&H programs were selected to provide a broad perspective of the safety management program at LLNL.

The Office of Oversight team selected the following areas for additional emphasis: self-assessments, training, aging facilities and equipment, and emergency management. These focus areas were selected based on an extensive Office of Oversight planning effort that included analysis of LLNL occurrence reports, interviews of management and staff, and review of a number of previous assessments at LLNL.

This Safety Management Evaluation and report is organized to provide perspectives on the seven major elements of a safety management system:

1. Policy, Leadership, and Worker Empowerment
2. Clear Roles, Responsibilities, and Accountability
3. Balanced Priorities
4. Competence Commensurate with Responsibility
5. Identification of Standards and Requirements
6. Hazard Analysis, Work Planning, Hazard Controls, and Operations Authorization
7. Performance Evaluation and Feedback

The seven evaluated elements closely correspond to the seven guiding principles but have been modified to provide a more effective independent evaluation of the safety management program. Most notably, two closely related principles (Hazards Controls Tailored to Work Being Performed and Operations Authorization) are combined into one discussion for reporting and evaluation purposes, and an important element of the

core functions—Performance Evaluation and Feedback—is discussed as a separate element because of its importance to the safety management program.

The seven elements discussed in this report fall into two general categories. The first category encompasses the first three elements (Policy, Leadership, and Worker Empowerment; Clear Roles, Responsibilities, and Accountability; and Balanced Priorities), which correspond to management responsibilities. The second category encompasses the last three elements (Identification of Standards and Requirements; Hazard Analysis, Work Planning, Hazard Controls, and Operations Authorization; and Performance Evaluation and Feedback), which correspond to management's implementation of a safety management program. The fourth element (Competence Commensurate with Responsibility) deals with competence of personnel with ES&H and safety management responsibilities, and as such, is relevant to both categories.

Team Composition

The team membership, composition, and responsibilities are as follows:

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